

**SOCIO ECONOMICS  
OF NON-WOOD FOOD FOREST PRODUCTS  
TO THE COMMUNITY  
IN THE SOUTHERN COASTAL AREAS OF TANZANIA**

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**Abstract:** The role of the Non-Wood Food Forest products (NWFFP) on community livelihoods was investigated in the southern coastal areas of Tanzania particularly in three districts of Mtwara region namely Mtwara Rural and Tandahimba. The villages involved were four including namely, Mtiniko and Malamba in Mtwara Rural; Lyenje and Mahoha in Tandahimba districts. Data collection methods used included Literature review, Participatory Rural Appraisal through discussion with key informants, focus group discussions, households' interviews and transect walks. The criteria used to select the villages were that i) village communities uses different forms of NWFFP; ii) the villages are located at different distances from the market centre and main road to urban centres. Results indicate that in both villages, large proportions of communities depend on agriculture for their livelihoods. Major cash crops grown include cashew and cassava while food crops include sorghum and cowpea. The second main source of livelihoods is the exploitation of NWFFP for both food and income. A number of NWFFP has been identified and categorized into staple food, fruits and relishes. The most popular NWFFP is *Dioscorea hirtiflora* (*ming'oko*) and this used in different forms and it contributes significantly in addressing food insecurity caused by drought. There is great gender division with regards to exploitation on NWFFP and women are more engaged. This concludes that the exploitation on NWFFP tends should not be considered to be the only way of addressing food insecurity in study villages due to diminishing NWFFP. More effort needs to be put in promoting the production of cashew, cassava, sorghum for food as well as cowpea and pigeon peas.

**Key words:** Agriculture, cashewnut, Mtwara, Mtiniko, *ming'oko*, poverty

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## INTRODUCTION

The majority of people in Sub-Saharan Africa particularly for communities residing in rural areas continue to be vulnerable to environmental changes and this vulnerability is greatly increased by the grossly undeveloped agriculture and overdependence on natural resources in particularly forest products. In Tanzania for example, rain fed agriculture continues to be the backbone of the Tanzania economy and presently accounts for about half of the national income, contributing to three quarters of the exports, and is a source of livelihood for people (URT, 2001; Kashuliza *et al.*, 2002; Majule, 2008). Periodically there has been a shortfall of rain pushing people to live off natural products such as honey, wild fruits, vegetables, roots, tubers and edible mushrooms (Hakonen *et al.*, 1995).

Poverty is defined as a state of deprivation, prohibitive of decent human life (URT, 1999). Poverty is a result of many and often mutually reinforcing factors, including lack of productive resources to generate material wealth, illiteracy, and prevalence of diseases, discriminative socio-economic and political systems, natural calamities such as drought, floods, HIV and man-made calamities such as wars. Poverty can be described in two categories; *absolute* and *relative* poverty (Gillis *et al.*, 1996). While the latter refers to comparative inequality of welfare of different groups, the former refers to people who are struggling to stay alive. Household Budget Survey confirms that there are biggest differences in income poverty between urban and rural populations; rural households are much poorer than their urban equivalents in many aspects in Tanzania (HBS, 2002). Progress in poverty reduction is highly dependent on the growth of the economy, especially in agriculture and related rural non-agricultural activities (i.e. off-farm). This is because agriculture engages well over 70 % of the labour force in rural areas of Tanzania. Agricultural productivity fluctuations have resulted into rural people to engage themselves on alternative livelihood strategies such as exploitation of NWFFP ranging from fruits, roots, tubers and vegetables.

Several NWFFP serve two major purposes, as source of food, particularly as coping mechanisms against food insecurity and additional source of income. In some places, these products seem to be preferred to the conventional agricultural crops. There is various reason including apparently higher nutritive value, palatability, medicinal effects, socio-cultural effects, cheap and natural characteristics. Some of the indigenous non wood wild plants are not only nutritious but also strategic reserves of essential nutrients that are available at certain critical periods of the year when other more common sources of these nutrients are scarce or completely unavailable (Okigbo, 1977). During drought many communities in Tanzania divert to alternative sources of food such as food available from the forests (Majule, 2002, Liwenga, 2003). Some shrubs, trees or perennial leaf vegetables produce flushes during the dry season when conventional annual vegetables are scarce or unavailable (Uiso and Mahunnah, 2000). Many of these products increasingly find their way into the markets.

In 1994, the Southern Zone Research Priority Setting recognized a need for assessing the contribution of *ming'oko* as an alternative source of food because preliminary observation had shown that the exploitation of *ming'oko* was seen on the rise (Bennett *et al.*, 1979). A number of people could be seen along the Mtwara-Newala and Mtwara-Masasi roads selling large bundles of *ming'oko* (Likanda *et al.*,

1995). Nevertheless, the contribution of *ming'oko* to food security, poverty alleviation and their implication on environment was not clearly addressed. The overall objective of this study was to provide a comprehensive analysis of the role and place of NWFFPs in poverty alleviation in Tanzania. Specifically the study; i) assessed the availability, abundance and distribution of potential non-wood forest food products in the study area; ii) established the driving forces for harvesting and using non wood food forest products such as *Discorea histiflora* (*ming'oko*) in the study areas; iii) assessed the role of non-wood forest food products in poverty alleviation at the household level and iv) established the impacts of exploitation of the non wood forest food products on the environment.

## **THEORETICAL FRAMEWORK**

### **Rural Livelihood and Poverty Alleviation**

The way in which rural people obtain their livelihoods are adapted to the local physical and human environments and are subject to constant change (Ngailo *et al.*, 2003; Liwenga, 2003; Yanda *et al.*, 2005; Majule and Mwalyosi, 2005). When for example, land fails to produce either sufficient food crops or sufficient revenues for the purchase of food products and other basic needs, people are forced to seek alternative sources of income. In response to different crises households adopt coping mechanisms that may result in entirely different livelihood mixes. Coping mechanisms are invoked following a decline in normal sources of food and these are regarded as involuntary responses to disaster or unanticipated failure in major sources of survival (Ellis, 2000).

It is common for studies examining food systems under stress to deal with terms like coping mechanisms to imply actions taken by households following a decline in food supply. In this study, however, coping is used to take into consideration a diversity of factors that may be expected to determine the configuration of livelihood strategies over time, poverty is therefore regarded as one of the major underlying causes. According to Campbell (1990), coping cannot be isolated from other actions because many actions are taken as an integral part of rural livelihoods. Coping mechanisms are therefore not unique measures resorted to only in times of food stress but are elements that exist at all times, however, assume greater importance under difficult conditions. The translation of these ideas into reality necessitates the investigation of people's livelihood adjustments in relation to chaotic socio-economic situations and catastrophes (both man-made and natural) be they food insecurity, hunger famine outbreaks or poverty. Some of these crises, in many cases, are not occasional occurrences rather they are consequences of long-term processes especially poverty, which is caused by a combination of interacting factors of social, economic, political and natural dimensions (Sahl, 2001).

### **Poverty and Environment**

The environment and natural resource sector contributes to poverty reduction by supporting household economies in many ways. For example, NWFFPs such as fruits, mushrooms, roots, tubers, honey, wild meat, fish and fodder play a crucial role in the daily subsistence livelihoods of households. Wild vegetables are essential part of almost every household, accounting for about 80 percent of all side dishes in West Usambara and about 20 percent of the total foods consumed during the months of June and July (Mariki *et al.*, 2003). In the miombo woodlands, thirty-one common edible mushroom species in Tanzania are

widespread. Wild roots and tubers are also highly depended in Mtwara and Lindi Regions (MNRT, 2000). Food from forests includes fruits, leaves, seeds and nuts, tubers and roots, and fungi among others. A particular advantage of food products from trees and shrubs lies in their availability when cultivated foods are scarce or unavailable. Indigenous fruit trees, for instance, play an important role in the sustenance of livelihood in drylands, particularly in times of drought. Most of these fruits play an important role in the nutrition and economies of the areas they occur (Osmani, 1992). The exploitation of these products has environmental implications that need to be addressed. It was also important to examine how social and physical environment in the study area determines poverty.

### **Non-Wood Food Forest Products**

Food from forests includes fruits, leaves, seeds and nuts, tubers and roots, and fungi among others. A particular advantage of food products from trees and shrubs lies in their seasonal availability i.e. fresh leaves just before or at the beginning of rains while dried leaves, fruits or seeds can be stored and used when food is scarce during the dry season. This is of special importance to dryland communities. Indigenous fruit trees play an important role in the sustenance of livelihood in drylands, particularly in times of drought. In one study Taylor *et al.* (1995), identified nine fruit tree species of socio-economic importance in the drylands of eastern and southern Africa. Most of these fruits play an important role in the nutrition and economies of the areas they occur. Nutrition and poverty are regarded as very closely related themes, in which a study of nutrition can illuminate the study of poverty (Osmani, 1992).

Human beings have always used their immediate surrounding particularly forests for obtaining various needs (Likanda *et al.*, 1995). There is high dependence on the immediate natural vegetation, including the use of some of these plants as food (Harkonen *et al.*, 1995) vegetables, roots and tubers, seeds and fruits. For example, the local people in Ismani Ward use *mkunungu* leaves as vegetables for household consumption also for sale both within the village and the nearby Iringa Town (personal communication). However, little is known about the significance of the income accrued from the sales of *mkunungu* to the household economy and therefore its role in poverty and community livelihoods.

## **THE STUDY AREA**

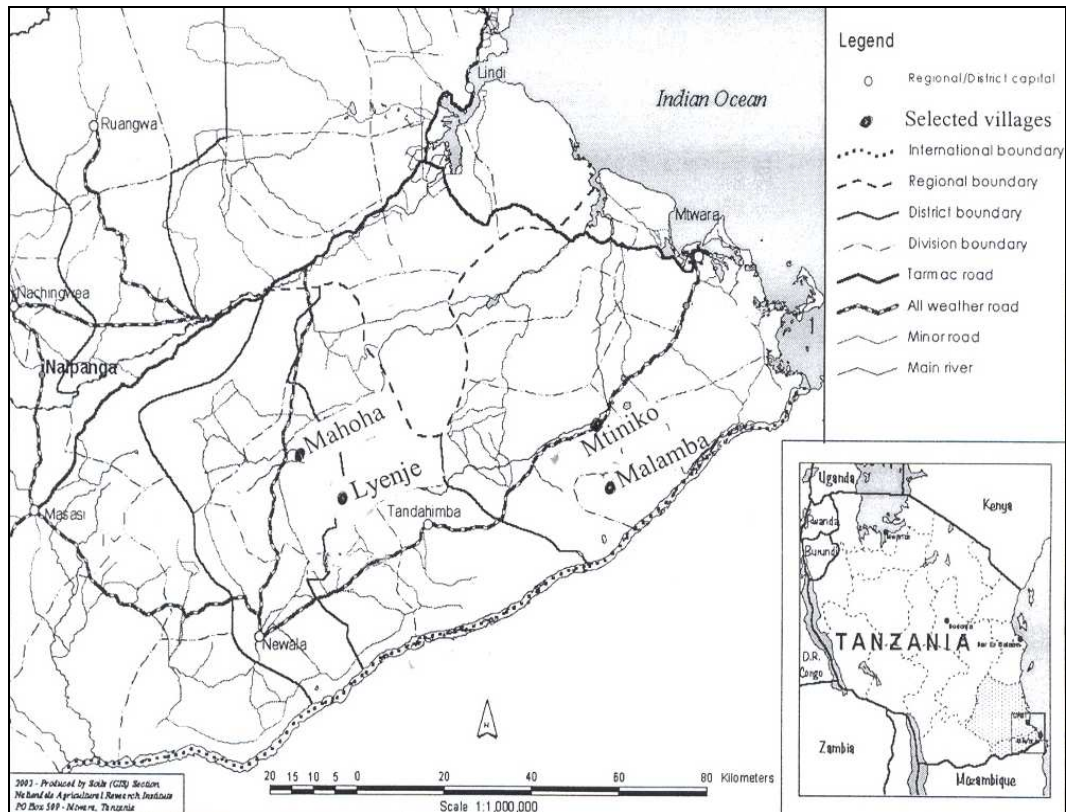
### **Location of the Study Area**

This study was undertaken in two districts in Mtwara Region; namely Mtwara Rural and Tandahimba (see figure 1). The areas cover the Makonde Plateau, which extends on the whole of Mtwara Region. Four villages were selected for the study, two from each district; these are Mtiniko and Malamba in Mtwara Rural; and Lyenje and Mahoha in Tandahimba District.

### **Description of Vegetation in the Study Area**

The four study villages situated in Mtwara Region lie within the coastal belt of Tanzania, and the vegetation of this belt is generally referred to as the coastal forests of Tanzania. The forests are complex in terms of their floristic composition. Local variation in the vegetation relate to factors such as the location of the forest in relation to soils, topography, prevailing wind directions and to the level of forest disturbance (Burgess *et al.*, 2000). Clarke and Robertson (2000) give a comprehensive description and analysis of the coastal

forests. They categorized the forests into five main types, namely: (1) East African Coastal Dry forests, (2) East African Coastal Scrub forests, (3) East African Coastal Brachystegia Forests (4) East African Coastal/Afromontane Transitional Forests, and (5) East African Coastal Riverine/Swamp/Ground water forests. Each of these types is further divided into several subtypes (Clarke and Robertson, 2000).



**Figure 1.** Geographical Location of Four study Villages in Mtwara and Tandahimba Districts

### **The Socio-economic Environment**

*Agricultural activities.* The economy of the people living in Mtwara Region depends upon agricultural production. The most prevalent crops in the southern belt are cassava (*Manihot esculentum*), cashewnut (*Anacardium occidentale* L.), coconut (*Cocos nucifera* L.) and sesame (*Sesamum indicum* L.). Besides, the main crops, maize (*Zea mays*), cowpea (*Vigna unguiculata*), sorghum (*Sorghum vulgare*), pigeon peas (*Cajanus cajan*) and groundnuts (*Arachis hypogea*) are important in the area and make an essential contribution to many farm households (Majule et al., 1997; Martin et. al., 1997). Legumes are for the relish and maize as supplementary food to cassava (Majule, 1999).

*Demographic characteristics.* The Inhabitants of the area predominantly comprise of the Makonde-Malaba, or coastal Makonde. Lesser populated groups include the Makua, Yao and settlers from other regions of Tanzania. The coastal population and population growth rates are relatively low compared to other

areas in the country. In 1988 the total population for Mtwara rural district was estimated at 169,436 with an average household size of 4.5. The National average household size was by then 5.2. (1988 Nat. Pop. Census). Regional population growth has been at 1.4 % per year (significantly the lowest in the country) against 2.8 % per year average National population growth for the period 1978-1988. However, population densities are relatively higher than National estimates. Regional population densities have been increasing from 37.2 persons per sqkm (1967), to 46.2 per sq km (1978) to 53.2 per sq km (1988), compared to the nations 19.8 persons per sq. km. (1978), and 25.3 persons per sq. km. (1988).

### **RESEARCH METHODOLOGY**

The methods of data collection ranged from literature search, interviews (i.e. both formal and informal), focus group discussions, field visits and collection of samples for identification and documentation. The collection of background information in relation to various socio-economic and ecological aspects of the specific study villages was done through a number of Participatory Research Approaches (PRA). In undertaking PRA efforts were made to capture people on the basis of age groups and gender. For each village, PRA session consisted of about 15 to 20 people. In this case, a list of villagers was obtained and categorized by gender and age groups of youth (15-24), middle aged (25-45 years) and the elder (46 and above). PRA was further employed to explore on socio-economic status of villagers including different wealth groups existing in the villages. Wealth ranking was therefore undertaken in the villages intended for detailed studies. Wealth ranking is an approach that can be used to provide information about the socio-economic characteristics of local people (Chambers, 1992; Mikkelsen, 1995). Focus group discussions involved researchers and 5 key informants per village. The focus interviews with key informants was based on the types of products collected, specific areas where they collect the products, details of harvesting and processing of the products, quantification of amount harvested, details of the marketing procedures and the amount of money obtained from the sales. Patterns of change over the years in the availability of the plants were further explored from the key informants. The discussion was followed by field visits and collection of samples for scientific identification and documentation. Household interviews were conducted using both structured and unstructured interviews (i.e. 10 % of village populations, in total 130 households).

### **RESULTS AND DISCUSSIONS**

#### **Village Profiles**

Mtiniko and Mahoha villages are located in Mtwara Rural District. Mtiniko village was established in 1967 with a total of 50 households at that time. The word Mtiniko in Makonde means delay. Historically, this place was a very famous route for the early traders arriving from different places including Mozambique. When the traders arrived at that area and before they proceed, they used to rest there and have their meals particularly coconuts, bambara nuts and a soft drink made by sorghum "togwa". Currently the village has 478 households and is made up of four sub-villages namely Ligula, Maili moja, Sokoni and Majengo. On the other hand, Malamba village, which is also located in Mtwara rural district, was established in 1967 following villagisation programme. The meaning of the village locally implies the traditional sand dams

available in the village. The village comprises of three sub-villages namely, Sokoni, Dodoma and Mkuranga. The village has a total of 393 households with a total population of 1248.

The majorities (97.4 % and 100 %) of the respondents from Mtiniko and Malamba villages respectively are Makonde by tribe. Similarly, in Lyenje and Mahoha villages, 100 % of respondents are Makonde. The Makonde dominated communities in the villages under study have existed over time and has contributed significantly in maintaining cultural as well as poverty alleviation strategies. This implies little opportunity to acquire experience from outside spheres of influence. Experience from other studies has shown that when there is a new tribe coming in, chances for changing or improving livelihood strategies are high due to introduction of new socio economic or livelihood strategies (Kangalawe et al., 2005; Yanda et al., 2005). Major social services available in these villages include the roads connecting the villages to district headquarters. Each village has three major committees responsible for different development programs. These are Planning and Finance; Defence and Security; and Social Services it was also established that there have been interventions from different institutions with the purpose of poverty alleviation, yet more effort still needs to be done in addressing poverty in the area.

### Profiles of Respondents

*Composition of Respondents.* The composition of respondents is shown in table 1. During household interviews, 42.5 % and 75.6 % of the respondents in Mtiniko and Malamba villages were males, whereas 57.5 % and 24.4 % of the respondents respectively were women. In Lyenje and Mahoha villages 64.7 % and 78.6 % of the respondents respectively were male, whereas 35.3 % and 21.4 % respectively were female. Availability of more male for interviews than female was explained to be due to the fact that at that time, female were already in the field to collect NWFPP particularly ming'oko.

**Table 1.** Composition of respondents by sex  
(Source: Household survey, 2004)

| District/village  | Mtwara Rural district |              | Tandahimba district |              |
|-------------------|-----------------------|--------------|---------------------|--------------|
|                   | Mtiniko (%)           | Malamba (%)  | Lyenje (%)          | Mahoha (%)   |
| Male              | 42.5                  | 75.6         | 64.7                | 78.6         |
| Female            | 57.5                  | 24.4         | 35.3                | 21.4         |
| <b>Totals (%)</b> | <b>100.0</b>          | <b>100.0</b> | <b>100.0</b>        | <b>100.0</b> |

Table 2 presents marital status of households on study areas. It is also interesting to note from the household interviews that out of the 40 respondents in Mtiniko village, 50 % were married, 32.5 % were unmarried, 12.5 % were widows and 5 % were divorced. On the other hand, in Malamba village out of the 41 respondents, 78 % were married, 4.9 % were unmarried, 4.9 % have separated, 2.5 % were divorced and 9.8 % were widows.

In Tandahimba districts, 70.1 % of respondents in Lyenje village were married, 22.5 % were unmarried, 2.5 % were widows and 5 % were divorced. On the other hand, in Mahoha village 76.9 % were married, 5.9 % were unmarried, 4.9 % had separated, 5.5 % were divorced and 6.8 % were widows. It can therefore be concluded that the majority of households in the study villages are managed by married couples. It is evident that in all villages close to the main road or near market centre having more social interactions the proportion of un

married people is high as compared to villages for from market centre and main road to Mtwara. This indicates that suitable social economic infrastructure and more social interactions have attracted people of different groups into these areas.

**Table 2.** Marital Status of Households in Study Villages  
(Source: Household survey, 2004)

| District/village  | Mtwara Rural district |              | Tandahimba district |              |
|-------------------|-----------------------|--------------|---------------------|--------------|
|                   | Mtiniko (%)           | Malamba (%)  | Lyenje (%)          | Mahoha (%)   |
| Married           | 50.0                  | 78.0         | 70.1                | 76.9         |
| Unmarried         | 32.5                  | 4.9          | 22.5                | 5.9          |
| Divorced          | 5.0                   | 4.9          | 5.0                 | 5.5          |
| Widows            | 12.5                  | 2.5          | 2.5                 | 6.8          |
| Separated         | -                     | 9.8          | -                   | 4.9          |
| <b>Totals (%)</b> | <b>100.0</b>          | <b>100.0</b> | <b>100.0</b>        | <b>100.0</b> |

*Origins and Reasons for Settling in the Villages.* In Mtwara rural district, 53.8 % of the people interviewed were born in Mtiniko village while 30.8 % originated from nearby villages but within the same district. 12.8 % originated from outside the district but within Mtwara Region, whereas, the rest (2.6 %) originated outside Mtwara region. In Malamba village, 53.7 % were born within the village, 12.2 % outside the village but within the same district, 31.7 % outside the district mainly from Tandahimba and the rest (2.4 %) outside Mtwara Region. Malamba village is less populated as compared to Mtiniko village and it has enough land and this attracts more people to come.

Reasons for moving into the villages varied considerably. For example 52.6 % of respondents who migrated into Malamba village followed land for cultivation while 21.1 %, 21.1 % and 5.3 % followed parents, a husband or escaped war from Mozambique in late 1970's respectively. It should also noted that Malamba village is very near to the boarder between Tanzania and Mozambique. Those who migrated into Mtiniko village 42.1 % followed their parents and 36.8 % followed marriages. The rest, that is 10.5 %, 5.3 %, 5.3 % respectively came into a village for due to marriage, followed agricultural land and were brought there under villagilization program in 1975 respectively.

On the other hand, 55.9 % of respondents in Lyenje were born in the village, 32.4 % originated from nearby villages but within the same district while 8.8 % and 2.9 % respectively originated outside Tandahimba District but within the region and outside the region respectively. In Mahoha Village, 71.4 % were born within the village and the rest migrated from nearby villages within the same district while 7.1 % originated from other districts but within Mtwara Region. Major reasons for coming into a village are quite similar to those reported for villages in Mtwara rural. For example, 53.3 % of respondents who migrated in Lyenje village followed their parents, 20 % followed marriage and the rest came for various reasons including labour selling, looking for medical treatments and due to villagillization program in 1975. Those who migrated in Mahoha village also came for various reasons including following marriages (50 % of respondents), looking for farmland (25 %) and following their relatives (25 %). The proportion of those who followed marriage and those looking for farmland in Mahoha village seems to be quite reasonable because this village is still quite new; more people are still coming in. Apparently, this study did not establish out migrants in all villages at any time since village establishment.



*Education Level of Respondents.* Out of the total respondents interviewed in Mtiniko village, 32.5 % had no formal education, 62.5 % had completed primary education, 5 % did not completed primary education and none had secondary education (table 3). On the other hand, out of the total respondents interviewed in Malamba village, 39 % had no formal education, 46.3 % completed primary education, 9.8 % did not completed primary education and 4.9 % had secondary education. Major reasons for such a large proportion of people with no formal education are probably due to lack of awareness on education or existence of one primary school per village. In Tandahimba district, Mahoha village (table 3) has the lowest number of respondents (14.3 %) with no formal education. However the proportion of those who did not complete primary education is the largest. This is because in Mahoha there is no primary school and people are required to attend primary school in Lyenje village after completing nursery school available in the village. In Lyenje village, the education status of respondents is quite similar to that reported for Mtiniko and Malamba villages.

An education level is one of the poverty indicators listed by Kikula *et al.* (2001). Having a considerable number of households who did not attend formal education may suggest high levels of poverty in most villages studied. See for example in Lwenje village in Table 3 indicating that 41.2 % of households interviewed did not attend formal education corresponds to the highest number of people under poor category (80 %) in term of wealth (table 3)

**Table 3.** Education Level of Respondent  
(Source: Household survey, 2004)

| Education levels                   | Mtwara rural District |              | Tandahimba district |              |
|------------------------------------|-----------------------|--------------|---------------------|--------------|
|                                    | Mtiniko (%)           | Malamba (%)  | Lyenje (%)          | Mahoha (%)   |
| No formal education                | 2.5                   | 39.0         | 41.2                | 14.3         |
| Completed Primary education        | 62.5                  | 46.3         | 52.9                | 64.3         |
| Did not complete primary education | 5.0                   | 9.8          | 5.9                 | 21.4         |
| Secondary Education                | 0                     | 4.9          | 0                   | 0            |
| <b>Totals (%)</b>                  | <b>100.0</b>          | <b>100.0</b> | <b>100.0</b>        | <b>100.0</b> |

### Major Economic Activities

Table 4 presents major social economic activities in the four villages studied. The majorities of the respondents in the four villages depends their livelihoods on crop production which is subsistence in nature. Agriculture is associated with other livelihoods in particularly the exploitation on NWFFP and livestock keeping in all villages. In Mtiniko village, pottery also contributes to livelihood of few farmers. According to the survey, in Mtiniko village 41 % of households undertake agriculture and exploit NWFFP while 21 % undertake crop production and keep livestock while the same proportion undertake crop production and pottery activity. Only 9 % undertake both livestock keeping and pottery. In Malamba village (table 3), almost the same proportions of households interviewed undertake both crop production and exploitation on NWFFP (49 %) as well as crop production and livestock keeping (59 %). Large proportion of households undertaking crop production in Malamba than Mtiniko is due to the fact that the former has ample land for livestock keeping with suitable livestock feed as it is located in remote area (far from the main road). Diversification of livelihood strategies in both villages has enabled people to sustain their life over time.

In Lyenje and Mahoha villages in Tandahimba district major socio economic activities also include agriculture (crop production), exploitation of

NWFFP and livestock keeping. Likewise in Mtwara rural, these activities are not undertaken in isolation. In Mahoha village, those undertaking agriculture and NWFFP exploitation are 55 % while livestock keeping and crop production accounts for 45 % of the total households interviewed. Being remotely located, 61 % of the households interviewed in Mahoha village undertake crop production and keep livestock while only 39 % undertake crop production and exploit NWFFP. In this case, exploitation of NWFFP seems to be less important in Mahoha village because the village has no thick forest to provide enough products due to land clearing for agriculture and livestock grazing.

**Table 4.** Three Major Occupations of Respondent per Village in %  
(Source: Household survey, 2004)

| Major activities                               | Mtwara rural District |             | Tandahimba District |            |
|--|-----------------------|-------------|---------------------|------------|
|  | Mtiniko (%)           | Malamba (%) | Lyenje (%)          | Mahoha (%) |
| Crop production with NWFFP                     | 49                    | 49          | 55                  | 39         |
| Crop production with Livestock keeping         | 21                    | 51          | 45                  | 61         |
| Crop production with Pottery                   | 21                    | -           | -                   | -          |
| Crop production with Livestock keeping+pottery | 9                     | -           | -                   | -          |
| <b>Total (%)</b>                               | <b>100</b>            | <b>100</b>  | <b>100</b>          | <b>100</b> |

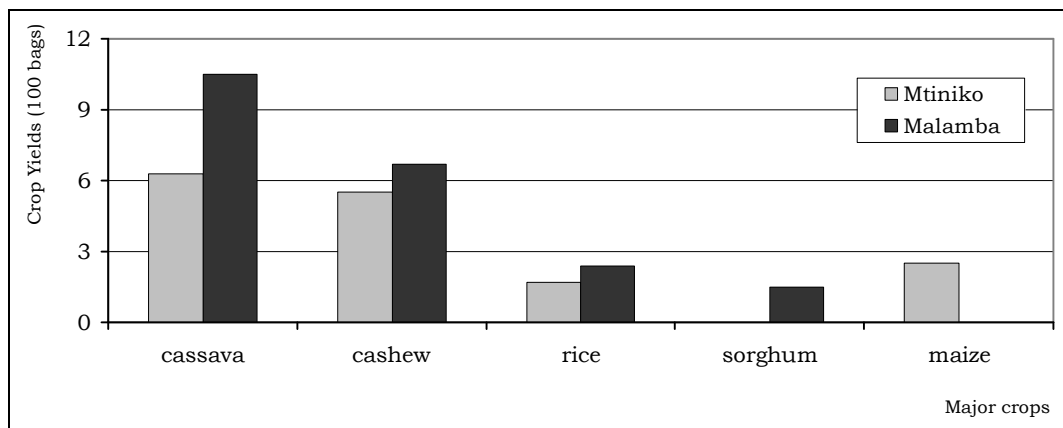
Major crops grown in the four villages studied are shown in table 5. In Mtiniko and Malamba villages the major crops are cassava and cashew, whereas other crops are rice and maize. Similarly, in Lyenje and Mahoha villages, major crops are cassava and cashew. Other crops include maize, sorghum and rice.

**Table 5.** Major Crops Grown in the Study Areas  
(Source: Household survey, 2004)

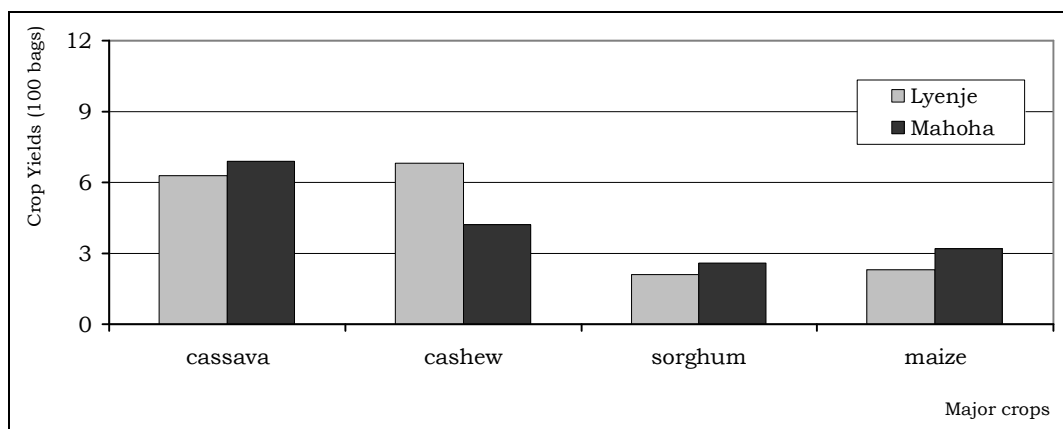
| List of major crops | Mtwara rural district |              | Tandahimba district |              |
|---------------------|-----------------------|--------------|---------------------|--------------|
|                     | Mtiniko (%)           | Malamba (%)  | Lyenje (%)          | Mahoha (%)   |
| Cassava             | 59.0                  | 68.3         | 44.2                | 45.4         |
| Cashew              | 35.9                  | 31.7         | 38.2                | 8.3          |
| Rice                | 2.6                   | -            | 2.9                 | -            |
| Maize               | 2.6                   | -            | 8.8                 | 7.2          |
| Sorghum             | -                     | -            | 5.9                 | 39.1         |
| <b>Total (%)</b>    | <b>100.0</b>          | <b>100.0</b> | <b>100.0</b>        | <b>100.0</b> |

Generally, there is very high dependence on cassava and cashew crops since these crops are the major sources of food and income respectively in the study area in the southern coastal areas as pointed by Martin *et al.* (1997). Figure 2 and 3 indicate crop yields of the major crops in the villages studied. Research and agricultural development program must therefore focus more on the improvement of these crops in order to alleviate poverty. In Mtiniko and Malamba villages, cassava and cashew production are the highest in terms of bags (100 kg). Most of cassava produced is sold to private sector and exported outside the country through Mtwara harbour. Similarly, cashew nut is also exported mostly to India and some is processed by mushrooming small scale group of people mainly women and sold locally. The contribution of both cassava and cashew sales on poverty was outside the scope of this study but findings forms the basis for future investigation. In Lyenje and Mahoha villages, the two crops (cassava and cashew) are also quite important and are produced in large quantities.

Based on Household surveys, three crops needs to be promoted in order to alleviate poverty, 55.3 % of respondents in Mtiniko village mentioned that cashew crop be the first one and this was followed by cassava as pointed out by 39.5 % of the respondents and the last one was rice which scored only 5.3 %. In Malamba village, 73.2 % of respondents would like cashew production be improved followed with cassava (22.0 %) and then rice and maize as indicated by 2.4 % of respondents in each case. Similarly, in Lyenje needs for crop improvement were in the order cashew (44.1 %), cassava (35.3 %), maize (11.8 %) then sorghum and groundnut while in Mahoha village major crops to be improved was in the order cashew (53.3 %), cassava (15.4 %) then sorghum, maize and groundnut (each 7.7 %). There have been a number of research programs undertaken in the area in order to improve the production of cashew and cassava crops. However based on this study, the production is still poor and thus contribution to poverty alleviation is still low. Some of the problems which significantly affect the production of agricultural crops are discussed in section 5.7 of this report. In this respect, a considerable number of respondents indicated a need for more effort to improve these crops.



**Figure 2.** Yields of Major Crops in Mtiniko and Malamba Villages  
(Source: Household survey, 2004)



**Figure 3.** Yields of Major Crops in Lyenje and Mahoha Villages  
(Source: Household survey, 2004)

Improvement in productivity can also be achieved if the people can allocate enough time and resources in agriculture rather than spending much time on exploitation of NWFFP which does not contribute significantly to poverty alleviation.

### Existing Wealth Groups in the study villages

Assessment of poverty levels and various poverty alleviation strategies necessitated a socio-economic analysis of the local communities. This assessment was done in collaboration with the villagers during the PRA sessions using locally defined criteria. Based on wealth ranking, three major socio economic groups were identified in all the four studied villages. These wealth groups namely *Matajiri* or “*Wakupata*”, “*Wahyo*” and *Wafukara* or “*Wakubanika*.”

*Local Classification of Communities based of Wealth Indicators.* The findings indicate that socio-economic differentiation is based on livestock ownership, farm size owned for cash and food crops production, asset ownership and quality as well as the number of wives one has. Based on wealth ranking exercise, the majority of the households in all the studied villages are poor (i.e. 80 % in Mtiniko, 60 % in Malamba, 80 % in Lyenje and 75 % in Mahoha). The poor groups who are the majority (Table 6) are for example characterised by having poor houses, earning less income per year (less than Ts 30,000) and are food unsecured. Few households are located in the well-off category (i.e. 8 % in Mtiniko, 8 % in Malamba, 3 % in Lyenje and 10 % in Mahoha). Their characteristics are summarized in table 6 below.

In general, the study has established that the three groups are highly interdependent in terms of social economical relationships and this has been maintained over years. For example the poor selling labour to the rich.

**Table 6.** Characteristics of Three Major Wealth Groups  
(Source: Field Survey, 2004)

| Major Group  | Major characteristics   |
|--|---|
| The Well-off<br>( <i>Matajiri/Wakupata</i> )<br><br>Mtiniko (8 %)<br>Malamba (8 %)<br>Lyenje (3 %)<br>Mahoha (10 %)                | <ul style="list-style-type: none"> <li>-Have more than 20 goats and more than 30 chicken;</li> <li>-Owns over 20 acres of cashew field and over 10 acres of food crop land;</li> <li>-Food security (obtain surplus food)</li> <li>-Have between 1 to 3 modern houses and 2-4 wives;</li> <li>-Have 3-4 bicycles</li> <li>-Have Sulphur dusting equipment (blower) for cashew nuts</li> <li>-Ability to hire labour</li> <li>-Average income of over 2 Tshs million per year.</li> </ul>  |
| Intermediate<br>( <i>Wastani/Wahyo</i> )<br><br>Mtiniko (12 %)<br>Malamba (32 %)<br>Lyenje (17 %)<br>Mahoha (15 %)                 | <ul style="list-style-type: none"> <li>-Have between 3 and 5 goats;</li> <li>-Have less than 10 chicken;</li> <li>-Owns up to 10 acres of cashew field and 5 acres for food crops</li> <li>-Have food (rarely surplus);</li> <li>-Have 1 house (grass-thatched or with corrugated iron sheets)</li> <li>-Can have 1 bicycle</li> <li>-Can hire equipment for spraying pesticides</li> <li>-May hire labor for agricultural activities on loan basis</li> <li>-Average income of between 50,000 to 800,000 Tshs per year.</li> </ul>   |
| The Poor<br><br>( <i>Wafukara</i><br><i>Wakubanika</i> )<br><br>Mtiniko (80 %)<br>Malamba (60 %)<br>Lyenje (80 %)<br>Mahoha (75 %) | <ul style="list-style-type: none"> <li>-Have no goats and chicken,</li> <li>-Own less than 2 acres of cashew nut field,</li> <li>-Owns less than two acres land for food crops,</li> <li>-Have 1 traditional house (grass-thatched),</li> <li>-Inability to use pesticides in cashew nut fields</li> <li>-Inability to hire labour, mostly employed as casual labourers</li> <li>Average income per year (less than 30,000 Tshs.)</li> <li>-Always food insecure and depend mostly on consumption and sales of non-wood food forest products e.g. <i>mingo'oko</i></li> </ul> |

*Socio-economic Groups and Poverty Alleviation Strategies.* The findings indicate that livelihood strategies for households in the well-off category are based on production of both cash and food crops. The main differentiating characteristic appears to be on the ownership of cashew nut fields and the ability to manage them. In order to realize good harvests of cashew nuts one has to use a variety of agricultural inputs such as pesticides particularly sulphur, anvil and others that can be achieved mainly households in the well-off category. In study area, such group is very small in number but may have huge number of acres of cashew fields which are properly managed. This is the case with Lyenje village (table 6) and this has created a huge difference in terms of portions between the rich and the poor. Generating surplus capital imply ability to purchase agricultural inputs and therefore good management of crops. Proper management of large crop fields also requires a higher labour input therefore one has to be able to pay for hired labour. Additionally, households in the well-off group have the ability achieve food security throughout the year depending on own agricultural production and therefore spend less on food purchases.

The poor appear to spend much time working as hired labourers in other people's farms in particular the rich performing various tasks. This means that they have less time to work in their own fields and therefore realize poor harvest, obtain insufficient income and therefore are trapped in the vicious cycle of poverty. The livelihood strategies for the poor are mainly based on selling their own labour to the well-off members within or outside their villages. Furthermore, the findings indicate that most of the time for the poor households is spent in searching either for food particularly the non-wood forest products for direct consumption or for sale so that they are able to buy food. Utilisation of the non-wood forest products is a traditional practice in the studied villages. However, the importance and extent of use differ among the socio-economic groups. *Ming'oko* was reported to be the major non-wood forest products potential for both income and food in the studied villages.

### **Useful NWFFPs in study Villages**

*Identification of NWFFP in the Study Area.* Over decades, community members of in the studies villages have survived through the utilization of different non-wood food forest products, which are available in the area. Examination of vegetation in the four study villages revealed that three villages, Mtiniko, Malamba and Lyenje fall within East African Coastal Scrub forests. Mahoha village on the other hand is characterized by vegetation that can be described as East African Coastal *Brachystegia* Forest. Both the Scrub and *Brachystegia* forests in the study area have been subjected to heavy disturbance following clearance or seasonal burning.

Single species dominance is rarely encountered among the scrub forests and as such they are described as Mixed Scrub forests. They are characterized by a canopy of up to six meters high with interspersed emergent such as *Millettia stuhlmanii*, *Milicia excelsa*, *Parinari excelsa*, *Vitex sp.* etc. Lianas are abundant especially *Landolphia sp.* *Brachystegia* forest occurs on well-drained, nutrient poor or heavily leached soils, especially on slopes or white sand, the crowns are non-interlocking. *Hymenaea verrucosa* and *Julbernardia magnistipulata* are reported to be co-dominants with *Brachystegia*.

During this study, a list of NWFFPs ranging from food to vegetable and fruits was generated. These products appear to be common to all villages and

most of them are obtained from the forest surrounding the villages. The different species harvested for NWFFPs from each village is presented in table 7. The first three products have been arranged in their order of importance, whereas the rest have more or less similar importance. From table 7 it can be seen that *ming'oko* ranks number One, followed by *uyoga* (mushroom) and *vitolo* (wild fruits). The importance of *Dioscorea hirtiflora* (*ming'oko*), is based on two main factors its role as both food and cash crop and its availability which is almost throughout the year.

**Table 7.** Summary of Identified NWFFP in the Study Villages  
(Source: Field data, 2004)

| Local Name                           | Scientific Name   | Mtiniko                             | Malamba                             | Lyenje                              | Mahoha                              |
|--------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Ming'oko<br>(Roots)                  | <i>Dioscorea hirtiflora</i> ssp.<br><i>orientalis</i> Milne-Redh. | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Uyoga<br>(Mushroom)                  |   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Vitolo<br>(Fruit)                    | <i>Dictyophleba lucida</i><br>(K.Schum.) Pierre                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Mnjunju<br>(Fruit)                   | <i>Bosqueiopsis gillettii</i> De<br>Willd.                        |                                     |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Mahamahama<br>(Fruit)                | <i>Deinbollia borbonica</i><br>(Sond.) J.H. Hemsel                | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Muhwe<br>(Fruit)                     | <i>Dovyalis hispidula</i> Willd.                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Matili                               | <i>Landolphia kirkii</i><br>Dyer                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Unyeu/Unewu/Mnewu/<br>Msegeo (Fruit) | <i>Manilkara discolor</i> (Sond.)<br>J.H. Hemsel.                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Makung'u<br>(Fruit)                  | <i>Salacia madagascariensis</i><br>(Lam.) D.C.                    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Makung'u<br>(Fruit)                  | <i>Salacia madagascariensis</i><br>(Lam.)D.C.                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Vipwipwi<br>(Fruit)                  | <i>Salacia stuhlmanniana</i><br>Loes.                             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Usofu<br>(Fruit)                     | <i>Uvaria leptocladon</i> Oliv.                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Maungo<br>(Fruit)                    | <i>Saba comorensis</i>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Usofu<br>(Fruit)                     | <i>Uvaria leptocladon</i> Oliv.                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

*Availability and Harvesting of the NWFFPs in study Villages.* Most of the NWFFPs are obtained from the nearby thickets in each village. Common fruits like makung'u are harvested during the dry season (photo 1) and are usually consumed by local people or sold in Mtwara town. Harvesting of ming'oko in particular is done in the undisturbed forests, fallow land and areas recently cleared for cultivation (photo 2). The part of the crop that is harvested is the roots of the crop (photo 3). Harvesting of ming'oko was reported to be undertaken in all the four villages under study. Women are the ones normally fully involved in the harvesting of ming'oko. They spend most of their time in the forest looking for product. In Mtiniko village, harvesting of NWFFPs takes place from the scrub forest as well as fallow land close to settlements. The most common tree species encountered in the forest are *Hymenocardia ulmoides*, *Pteleopsis myritifolia*, *Dalium holtzii*, *Grewia* sp., *Dalbergia melanoxylon*, *Azelia quanzensis*, *Lannea* sp., *Ochna holstii* etc. The informants

reported that in the fallow land *ming'oko* are of small size than those obtained from undisturbed forest.

Malamba village is surrounded by Scrub forest, though at varying levels of disturbance. The NWFFPs are obtained from both the undisturbed forest and disturbed forest. Common tree and shrub species observed in the scrub forest were: *Pteleopsis myritifolia*, *Albizia gummifera*, *A. vesicolor*, *Manilkara mochisia*, *Hymenocardia ulmoides*, *Ozoroa mucronata*, *Markhamia obtusifolia*, etc. Most of the fruits come from woody vines, which perform well in disturbed and undisturbed forest areas. On the other hand, Mahoha village is surrounded by vegetation type described as East African Coastal *Brachystegia* Forest. The vegetation is denser than scrub forest. Characteristic species recorded here include: *Afzelia quanzensis*, *Pтелиopsis myritifolia*, *Diopyros verrucosa*, *Bombax rhognaphalon*, *Hollarhenna sp.*, *Hippocratea sp.*, *Markhamia obtusifolia*, *Lonchocarpus bussei*, *Albizia pertesiana*, *Combretum molle*, *Sclerocarya birrea* etc. Only a few of the big trees have been retained within the village, the rest have been cleared to give room for cultivation of crops.

The vegetation of Lyenje village is scrub forest, although it is at varying degrees of disturbance. Most of the natural vegetation has been cleared for cultivation of cassava, maize, peas etc. Cashew nut trees are also becoming part of the natural vegetation. A few areas still maintain their natural vegetation; the local people refer to them as '*msitu*'. These are places where opening of new farms is carried out and indeed are the areas where the *ming'oko* and other NWFFPs are harvested. The local communities continue to harvest *ming'oko* in such places even after slash and burn, although it becomes more difficult to locate the plants once the aerial parts of the plants have been burnt. The most common species recorded in these areas includes, *Hymenocardia ulmoides*, *Pteleopsis myritifolia*, *Grewia spp*, *Annona senegalensis*, *Croton sp*, *Diospyros verrucosa*, *Markhamia obtusifolia*, *Lannea sp*, *Dalbergia spp.*, etc.

*Availability and Utilisation Patterns over Time.* Discussions with villagers in the study area revealed a number of issues related to availability of the NWFFPs particularly the *ming'oko*. The findings give an indication that availability of *ming'oko* has declined particularly in the recent years. The main reasons for such a decline includes: increase in population and increased uses of the products i.e. for both consumption and cash. Furthermore, the villagers reported that increasing drought periods due to climate change and variability aggravated the observed decline in availability of the product. Table 8 presents the availability patterns of *ming'oko* over three periods (i.e. prior to villagisation, following villagisation and the recent situation).

As mentioned earlier, the use of NWFFPs in the villages under study has been there over decades. In the past (prior villagization period) *ming'oko* and other related NWFFPs were easily available at the village because people were very few and most of the area was covered by thick forest. The sizes of *ming'oko* was also very big comparable to the size of cassava. During that time, the crop was less valued because the production of other crops like maize and sorghum was high due to high soil fertility. With time, the forest area decreased due to increased human population and this contributed to significant reduction in the amount of *ming'oko* collected. The product also became very important because it serves people's life during famine periods or in case of drought. This has created over-exploitation of the product and as a result; (1) people have to spent more time by walking far in search of the product and (2) the sizes of *ming'oko*

has decreased because most of the product is harvested while young. Of additional interest in the surveyed villages is the use and exploitation of *ming'oko*. The product constitutes the major part of the people diet and is taken at least once a day. There are three major ways of preparing the product; i) First the product is cooked raw with salt like cassava or sweat potato and eaten; ii) Second, the product can be cooked, pound and taken together with fried cassava flour and this is traditionally known as "*Chikandanga*"; iii) Today, the product can be cooked pound and mixed with oil crops like sesame or groundnut and taken with stiff maize or cassava. In this case this is traditionally known as "*Nabulile*".

**Table 8.** Availability of *Ming'oko* During three Historical Periods

| Attribute    | Prior to villagisation (<1975)   | Following villagisation (1975-2000)  | Current situation (>2000)  |
|--------------|--|--|--|
| Availability | Easily available<br>Plenty   | Slight difficult<br>Slight decrease  | Difficult to access  |
| Distance     | Found very close<br>Nearby   | Slight increase in distance  | Increase in distance<br>(up to 5 km)                                       |
| Size         | Large sizes  | large size few, Moderate size  | Moderate<br>but small size many  |
| Reasons      | Low consumption<br>of ming'oko due<br>to high availability<br>of agricultural products | Increase in population and<br>roles of the product i.e. for<br>food and cash | Experience less rains and<br>increased alternative uses<br>of the product. |

### **NWFFPs and Poverty Alleviation**

*Driving Forces for Utilization of the Products.* Most people living in the village are engaged in agriculture activities whereby different food and cash crops are produced. They also keep small ruminants animals particularly goat and birds. The production of different food crops in the area is poor due to poor physical environment such poor soils which are sandy in nature as well as poor rainfall distribution in the area. Furthermore, the areas have serious water shortage problems for domestic use and irrigation of which if available it could have been used to irrigate vegetables. Food shortage is therefore a serious problem in the area and the available option to solve this problem is to engage in other livelihood activities such as the exploitation of *ming'oko*. Exploitation of various NWFFP is currently part of the major livelihood activities for communities in the studied villages. The same households who exploit NWFFPs also undertake agriculture and other related livelihood activities.

On the other hand, very few farmers can manage cashew nut fields properly in order to ensure that there is enough production for sale in order to obtain cash to support their livelihoods. The exploitation of NWFFP has become very important since the little money, which is generated, is used to meet other household requirement at household level. It can be observed that the exploitation of *ming'oko* cuts across gender, whereas women are mainly involved in harvesting and selling within the villages the male youths are mostly involved in trading of the product particularly outside the villages.

*Contribution of NWFFP to Poverty Alleviation.* The findings from this study give an indication that the exploitation of different NWFFP in all the surveyed villages contributes to the livelihood security of the community particularly as source of food and income (table 9). The harvesting frequency of the product varies depending on household needs on average at least 3 times per week.



However, it was reported that the poor households harvest the product almost daily. Ming'oko is served for meals at least once every day. An individual can harvest up to 12kg of ming'oko per week, part of which is normally consumed and part of it sold. At least 5,000/= (Tshs.) return is possible from the sale of a week's collection of ming'oko. This is equivalent to \$5.

**Table 9.** Contribution of NWFFPs to Poverty Alleviation  
(Source: Household survey 2004)

| Response         | Mtiniko (%)  | Malamba (%)  | Lyenje (%)   | Mahoha (%)   |
|------------------|--------------|--------------|--------------|--------------|
| Yes              | 37.5         | 39.0         | 50.0         | 20.0         |
| No               | 57.5         | 56.1         | 47.1         | 53.3         |
| Not sure         | 5.0          | 4.9          | 2.9          | 26.7         |
| <b>Total (%)</b> | <b>100.0</b> | <b>100.0</b> | <b>100.0</b> | <b>100.0</b> |

Although, the findings presented in Table 9 indicate that the three out of four villages studied are of the opinion that the NWFFPs do not contribute much to poverty alleviation results may not be taken for granted. Differences between those who responded yes and no are not quite large with the exception of Mahoha village which again has large proportion of responded who are not quite sure whether it contributes to poverty alleviation or not. Based on such small differences and according to a very strong association between agriculture, livestock keeping and exploitation of NWFFPs there is strong evidence that exploitation of NWFFP does contribute to alleviate absolute poverty in all villages studied. A household budget based on exploitation of NWFFP developed during this study clearly demonstrates how communities can survive by exploiting NWFFPs. NWFFPs contribute to poverty alleviation is also based on the fact that the products can be sold to attain additional income and can help in coping with food shortages.

*Impacts of Utilisation of Non-wood Food Forest Products on the Environment.* Harvesting of NWFFP involves several processes some of which to have positive and some negative impacts to the environment. Harvesting of ming'oko involves digging the ground to expose the roots. This might have negative aspects on species composition of the area through interference with the seed bank and destruction of seedlings. However there is evidence based on this study that the exploitation of some of the NWFFP particularly ming'oko have a positive effect on environment through improvement of soil physical properties through mixing of the topsoil and subsoil. Being a poverty alleviation strategy, the exploitation of ming'oko is environmentally not against the goals and operational targets of the National Strategy for Growth and Reduction of Poverty (2005). The close association of ming'oko with the presence of forest or vegetation cover is an incentive towards environmental conservation through minimizing deforestation.

### **Major constraints towards poverty alleviation efforts**

There are a number of factors that affects the poverty alleviation strategies in the study area. The magnitude of the problems varies according to pair wise ranking exercise undertaken through PRA meeting. Table 10 presents a summary of major problems identified and their ranking. Generally, three major problems described to impinge poverty alleviation at Mtiniko village.

These include lack of water for domestic uses, lack of secondary school to educated children and lack of credit provision. It was reported that due to water

shortage in the village, people have to travel a long distance particularly during the dry season to look for water. Existence of lions in surrounding areas poses a security problem to the village members especially when they are working in farms. There was a serious complain from the villagers due to the absence of a secondary school to provide ordinary level education. This is a problem because students have to travel to either Tandahimba or Mtwara where there are secondary schools. In Malamba village, lack of water for domestic use is a major problem likewise in Mahoha village in Tandahimba district. Other problems are closely related and needs to be mitigated if poverty alleviation needs to be alleviated in the study area.

**Table 10.** Major Problems needs Addressing to Alleviate Poverty

| <b>Mtwara Rural District</b>   |                                   | <b>Tandahimba District</b>                                 |   |
|--------------------------------|-----------------------------------|--|---|
| <b><i>Mtiniko village</i></b>  | <b><i>Malamba village</i></b>     | <b><i>Lyenje village</i></b>                               | <b><i>Mahoha village</i></b>            |
| Lack of water for domestic use | Lack of water                     | Crop diseases  | Lack of Water                           |
| Lack of Secondary school       | Wild animals destroying crops     | Poor prices for crops                                      | Lack of Market for agricultural crops   |
| Lack of credit provisions      | Lack of health services           | Lack of secondary school for their children in the area    | Problem of Destructive animals to crops |
| Lack of agriculture inputs     | Low prices of crops               | Lack of an alternative cash crop                           | Lack of schools in the area             |
| Crops damage by wild animals   | High price of agricultural inputs | Lack and/or Shortage of Agricultural inputs and implements | Poor communication especially road      |

## CONCLUSIONS

Various livelihood activities are undertaken, the major one being agricultural production. Agriculture (crops and livestock) production is subsistence to majority of farmers in study village and this is undertaken alongside with exploitation of NWFFP. However, agricultural production in the area appears to be constrained due several factors including to low and declining soil fertility, recurrent droughts and lack of capital to invest on cash crops particularly cashew nut. Traditionally, *Dioscorea hirtiflora* is a product of more importance consumed under conditions of both food sufficiency and insufficient food supply. NWFFP does contribute to absolute poverty alleviation. A number of NWFFPs has been able to be identified and are traditional source of food and a means of obtaining some little cash income particularly to the poor members of community who are also the majority. Promotion of agricultural production particularly the cashew nut and cassava could further alleviate poverty of the people. Reducing overdependence on NWFFP is also likely to occur and this would help to conserve biodiversity in the area. Finally, more research is needed on economic and environmental values on NWFFP available in the study area.

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## REFERENCES

- BENNETT J.G., et al, (1979), *The Farming Systems and Development Prospects*. Volume 2 of Report of The Zonal Survey Team in Phase 2. Mtwara/Lindi Regional Integrated Development Programme, Tanzania. Project report 67, Land Resource Development Centre, UK Overseas Development Administration;
- BURGESS N.D., et al, (2000). *Section 3. Status and Vegetation, 3.1 Distribution and Status*, in: Burgess, N.D. and Clarke, G.P. (eds.). *Coastal Forests of Eastern Africa*. IUCN – The World Conservation Union, Cambridge. xiii+ 443pp;
- CAMPBELL D.J., (1990), *Strategies for Coping with Severe Food Deficits in Rural Africa: A Review of Literature*. Food and Food Ways. Vol.4 (2), pp143-162;
- CHAMBERS R., (1992), “*Rural Appraisal: Rapid, Relaxed and Participatory*”, Discussion Paper No.311, Sussex: Institute of Development Studies, 90p;
- CLARKE G.P., ROBERTSON, S.A., (2000), *Section 3. Status and Vegetation. 3.2 Vegetation Communities*, in Burgess, N.D. and Clarke, G.P. (eds.). *Coastal Forests of Eastern Africa*. IUCN-The World Conservation Union, Cambridge xiii+443pp;
- ELLIS F., (2000), *Rural Livelihoods and Diversity in Developing Countries*, Oxford University Press;
- GILLIS M., et al, (1996), *Economics of Development*, (New York: W.W. Norton & Company, Inc.);
- HARKONEN M., SAARIMAKI M., MWASUMBI L., (1995), *Edible Mushrooms of Tanzania*. KARSTENIA. Volume 35;
- INTINI M., SIJAONA M.E.R., (1983), *Little Known Disease of Cashew (Anacardium occidentale L.) in Tanzania*, Rivista di Agricoltura Subtropicalee, Tropicale 77 (3):423-429;
- KANGALAWA R.M., MAJULE A.E., SHISHIRA E.K., (2005), *An Analysis Of Land Use Dynamics and Land Degradation Process In the Great Rift Valley, Central Tanzania: A Case of Iramba District*, Book Published by OSSREA. ISBN 1 904855 62 8;
- KASHULIZA K., TARIMO A.J.P., ASHIMOGO G.C., (2002), *The Challenges of Research in Improving Agricultural Productivity in Tanzania*, in Poverty Eradication and Sustainable Development. Proceedings of the second University-wide Scientific Conference. Held at Sokoine University of Agriculture, Morogoro 9-10 May 2002;
- LIKANDA S.N., et al, (1995), *Indigenous Soil Fertility Improvement Study*. (Unpublished) A First Technical Report Presented to the ODA Cashew Research Project, Mtwara Tanzania;
- LIWENGA E.T., (2003), *Food Insecurity and Coping Strategies in Semiarid Areas: The Case of Mvumi in Central Tanzania*, Stockholm Studies in Human Geography 11. Doctoral Dissertation. Stockholm University;
- MAJULE A.E., TOPPER C.P., NORTCLIFF S., (1997). The environmental Effects of dusting cashew (*Anacardium occidentale L.*) trees with sulphur in southern Tanzania. *Tropical Agriculture (Trinidad)*. Volume 74 No.1. pp 25-33;
- MAJULE A.E., (1999), *The Effects of Organic Residues and Elemental Sulphur Additions to Soils of Southern Tanzania*, PhD Thesis. The University of Reading, UK;
- MAJULE A.E., (2002), *Country Report-Tanzania State of Land, Water and Plant Nutrition Resources*. in. [www.fao.org/landandwater/swlwpnr/swlwpnr.htm](http://www.fao.org/landandwater/swlwpnr/swlwpnr.htm). Report Submitted to FAO, Rome, Italy
- MAJULE A.E., MWALYOSI R.B.B., (2005), *Enhancing Agricultural Productivity through Sustainable Irrigation. A case of Vinyungu Farming System in selected Zones of Southern Highlan, Tanzania*. A chapter in a Book Social and Environmental Impacts of Irrigation farming in Tanzania: Selected Cases: Edited by H.Sosovele, J. Boesen and F. Maganga. Dar es Salaam University Press. ISBN 9976 60 431 9;
- MAJULE A.E., KALONGA S., (2009), *Role of Local Knowledge and Innovations in Conserving Forest Biodiversity in Kilombero Wetlands, Tanzania*, The ICFAI Journal of Environmental Economics. Volume VII No. 1;
- MARIKI, S., SHECHAMBO, F., SALEHE, J., (2003), *The Contribution of Environmental Goods and Services to Tanzania's Economy: With Reference to Poverty Reduction*, Policy Brief No. 5. IUCN. The World Conservation Union;
- MARTIN P.J., et al, (1997), *Cashewnut Production in Tanzania: Constraints and Progress Through Integrated Crop Management*. *Crop Production*. 16: 6-14;
- MIKKELSEN B., (1995), *Methods for Development Work and Research: A Guide for Practitioners*, New Delhi: Sage Publications, 296 p;
- NGAILO J.A., KASWAMILA A.L., SENKORO C.J., (2003), *Rice Farming System of the Wasukuma and its Contribution to Poverty Alleviation*, Presented at the Fifth REPOA Workshops held at the White Sands Hotel, Dar es Salaam, Tanzania, March 21-22, 2002;
- OKIGBO B.N., (1977), *Neglected Plants of Horticulture and Nutritional Importance in Traditional*

- Farming Systems of Tropical Africa*, Acta Horticulturae (53): 131-151;
- OSMANI, S.R., (ed.), (1992), *Nutrition and Poverty. Wider Studies in Development Economics*. Clarendon Press Oxford;
- SAHL I.M.G., (2001), *Public Sector Salariat's Poverty – Coping Mechanisms: A Comparative Case from El-Obeid*, Eastern Africa Social Science Research Review. Vo. XVII. No.2, June. A Publication of Organisation for Social Science Research in Eastern and Southern Africa (OSSREA), pp.91-107;
- UIISO F.C., MAHUNNAH R.L.A., (2000), *Wild Food Plants and Additives in Health and Dietary Sufficiency*, in: Kauzeni (ed.) Gender, Biodiversity and Local Systems (LinkS) to Strengthen Agricultural and Rural Development. LinkS Report. No.2;
- YANDA P.Z., MAJULE A.E., MWAKAJE A.G., (2006), *Implication of Farming Practices on the Environment, Food Security and Poverty Levels in Matengo Highlands, Mbinga District, southern Tanzania*, The ICFAI Journal of Environmental Economics Vol. IV, No. 1;
- TAYLOR F., BUTTERWORTH W.K.J., MATEKE S.M., (1995), *Importance of Indigenous Fruit Trees in Semiarid Areas of Southern and Eastern Africa*, in: AAS Second Roundtable Discussion on NWFPs/NTFPs, Pretoria, South Africa;
- \*\*\* (2000), *The Role of Non-wood Forest Products in Food Security and Income Generation. Forestry and Beekeeping Division*, MNRT, Dar es Salaam, Tanzania;
- \*\*\* (2002), *Household Budget Survey, Key Findings*. National Bureau of Statistics, Tanzania;
- \*\*\* (1999), *Poverty and Welfare Monitoring Indicators*, Vice President's Office, URT – United Republic of Tanzania;

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